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Title : Hand Dryer

Claims

1. A hand dryer comprising: a processing space in which hands are inserted or extracted; a high-pressure air current generator that provides working air current; and a blowing nozzle that includes a plurality of slit-shaped blowing holes arranged in a width direction of the high-pressure air current generator and through which working air current from the high-pressure air current generator is jetted to the processing space.

2. The hand dryer according to claim 1, wherein the plurality of blowing holes is arranged in a front-back direction of the processing space.

3. The hand dryer according to claim 1, wherein the blowing holes are arranged in the front-back direction and a width direction of the processing space in a zigzag manner.

4. The hand dryer according to claim 2 or 3, wherein the blowing holes are arranged in the width direction of the processing space in an overlapped manner.

[0004]

In the conventional hand dryer including the above-described configuration, wet hands are quickly dried based on motion energy of high-speed air current, however, air current jetted from a blowing hole of the blowing nozzle does not hit the whole hands inserted into the hand insertion unit and drying efficiency is not good. When the blowing hole is increased in width, it is possible to expand a range to dry hands. However, speed of air current becomes slow. On the other hand, when the blowing hole is reduced in width, flow rate is increased, and a force to blow away waterdrops attached to surfaces of hands is large, consequently, noise is increased.

[0005]

The present invention is made to solve the problems. It is an object of the present invention to provide a hand dryer in which drying efficiency is increased without reducing wind speed of high-speed air current jetted from the blowing hole, noise is reduced, and a sense of use is improved.

[0012]

The blowing nozzle 12 is arranged above near the hand insertion port of the hand insertion unit 3 with its ejection hole faced downward. High-speed air current to remove moisture attached to hands inserted into the hand insertion unit 3 is jetted through a blowing hole 13 formed in the blowing nozzle 12 and waterdrops are removed and blown away from surfaces of hands without rubbing hands together.

[0013]

The blowing hole 13 formed in the blowing nozzle 12 is arranged in a width direction (in a front-back direction of the sheet surface of Fig. 1 or in a lateral direction of the sheet surface of Fig. 2) of the box body 1. For example, the blowing hole 13 is formed to have a rectangular shape like a slit. The plural rows of blowing holes 13 are arranged in a front-back direction (in a lateral direction of the sheet surface of Fig. 1 or in a vertical direction of the sheet surface of Fig. 2) of the box body 1, two rows of holes in the first embodiment, and are constituted of a first and a second blowing hole 13a and 13b.

[0014]

The operation of the first embodiment that has the configuration described above is explained. When wrists of hands are inserted from the hand insertion port 2 into the hand insertion unit 3, the hand detecting sensor 14 detects the insertion of the hands. Then, the high-pressure air current generator 8 is operated based on processing of the control circuit and high-speed air current that has high motion energy is jetted into the hand insertion unit 3 through the blowing nozzle 12. In this case, as shown in Fig. 3, high-speed air current jetted from each blowing hole, that is, from the first and second blowing holes 13a and 13b, which is a first and a second air current 15a, 15b, is increased in width while involving air in the surroundings, is joined with the surrounding air, and is made into a combined high-speed air current 15c that is larger in width.

[0015]

Thus, the high-speed air current 15c that is larger in width hits inserted hands and blows away moisture attached to them to a water

receiving unit 4 of the hand insertion unit 3. Furthermore, all waterdrops attached to the whole hands are removed by inserting or extracting them in the hand insertion unit 3, so that the hands are dried. After completion of the hand drying processing, when the hands are extracted from the hand insertion unit 3, the hand detecting sensor 14 detects the extracted hands and the high-pressure air current generator 8 stops. Waterdrops blown away from the hands flow toward a drain outlet 6 of the water receiving unit 4 that has a front tilting configuration and are housed in a drain container 7 from the drain outlet 6.

[0016]

The combined high-speed air current 15c that is larger in width increases a range of drying hands and can hit the whole hands, so that drying efficiency is increased. Moreover, it is possible to prevent noise from being generated because it is unnecessary to increase flow rate more than needed.

Meanwhile, conventionally, when only one row of blowing holes are arranged in a front-back direction, though a range in which hands are dried can be increased when a width of the blowing hole is increased, drying performance is reduced because of a slow flow rate of air current. When the blowing hole is reduced in width with a large flow rate and a force to blow away waterdrops on surfaces of hands is increased, drying efficiency is improved. However, noise of blown air current and noise due to air current collision that is caused when air current hits hands are increased. The noise of blown air current and the noise caused by air current collision are proportional to about the sixth power of the flow rate, so that a slight increase of the flow rate significantly increases noise.

[0017]

[Second Embodiment]

Fig. 4 is a plan view of blowing holes of the hand dryer according to a second embodiment of the present invention. The same reference numerals are given to the same components as in the first embodiment and the explanation is omitted.

The blowing holes of the hand dryer are arranged in a zigzag manner in the second embodiment. In other words, they are aligned in a width direction of the box body 1, for example, three slit-shaped blowing holes 13 are arranged in such a manner that a first blowing hole 13a is arranged in a first front row in a front-back direction of the box body 1 and a second and a third blowing hole 13b, 13c are arranged at the same position in a second rear row in the front-back direction thereof. In this case, the same distance is away in a width direction between an edge of the third blowing hole 13c positioned in the second row and one edge of the first blowing hole 13a positioned in the first row and between the other edge of the first blowing hole 13a positioned in the first row and an edge of the second blowing hole 13b positioned in the second row.

The other operations and effects in the second embodiment are substantially the same as in the first embodiment and the explanation is omitted.

[0018]

[Third Embodiment]

Fig. 5 is a plan view of blowing holes of the hand dryer according to a third embodiment of the present invention. The same reference numerals

are given to the same components as in the first embodiment and the explanation is omitted.

The blowing holes 13 of the hand dryer are arranged in a zigzag manner in the third embodiment. In other words, they are aligned in a width direction of the box body 1, for example, three slit-shaped blowing holes 13 are arranged in such a manner that a first blowing hole 13a is arranged in a first front row in a front-back direction of the box body 1 and a second and a third blowing hole 13b, 13c are arranged at the same position in a second rear row in the front-back direction thereof. In this case, part of an edge of the third blowing hole 13c positioned in the second row and part of one edge of the first blowing hole 13a positioned in the first row are arranged in an overlapped manner almost by the same length in a width direction. Part of the other edge of the first blowing hole 13a positioned in the first row and part of an edge of the second blowing hole 13b positioned in the second row are also arranged in an overlapped manner almost by the same length in the width direction.

[0019]

According to the third embodiment that includes the above-described configuration, as shown in Fig. 6, air current distribution that corresponds to part in which the blowing holes 13 are arranged in an overlapped manner leads to generation of an air current width 15c that is locally thick. The part that is locally thick has a stronger force to blow away waterdrops than the other part. Therefore, for example, when the part that is locally thick is selectively used by applying it to finger tips in which waterdrops tend to remain, a sense of use is improved and drying efficiency is improved.